

QUALIFIED PRODUCT LIST
FOR
CONNECTICUT DEPARTMENT OF TRANSPORTATION PROJECTS

September 2005

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Connecticut Department of Transportation
Bureau of Engineering and Highway Operations
Office of Research and Materials

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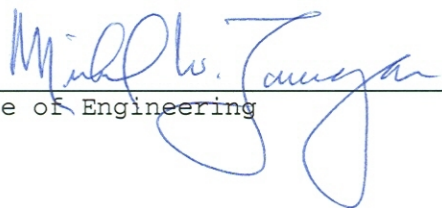
Andrew J. Mroczkowski
Committee Secretariat

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APPROVALS


Office of Research & Materials

9-7-05
Date


Office of Engineering

9/7/05
Date


Office of Construction

9/7/05
Date

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PREFACE

This Report has been developed as a means for determining what products, suppliers, manufacturers, equipment and methodologies may be used on ConnDOT construction projects. The items referenced have met the approval of ConnDOT personnel in one of the following ways:

- They have been approved by the Research Liaison Committee.
- They have been used successfully since before the establishment of a formal approval process.
- They currently satisfy Department of Transportation specifications.

It should be understood that this document is open to refinement and will be under close scrutiny to ensure that the information contained herein is complete and accurate. Over the years many items will be added and deleted.

Many products that may be used in ConnDOT will not be represented in this document because they conform to a generic specification, and the approval procedure is in accordance with the standard specifications.

**If you have any questions,
inquires or suggestions,
please contact:**

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Product Evaluation Web Site: <http://www.ct.gov/dot/qpl>

Qualified Product List: http://www.ct.gov/dot/LIB/dot/documents/dresearch/conndot_psl.pdf

AASHTO's Product Evaluation Listing (APEL) Program: <http://apel.transportation.org>

Products by Category

A-Adhesives and Bonding Agents
B-Asphalt Mixes and Additives
C-Asphalt Surface Treatments
D-Barriers Fencing and Roadside Structures
E-Drainage Structures
F-Erosion Control and Other Landscape Treatments
G-Joint and Crack Sealers and Fillers
H-Miscellaneous
I-Patch Materials
J-Pavement Marking Materials
K-PCC Mix Additives and Admixtures
L-Portland Cement Concrete Surface Treatments
M-Soil Treatments
N-Structural Materials and Components
O-Structural Paints and Coatings
P-Traffic Control Devices
Q-Waterproofing Membranes and Materials

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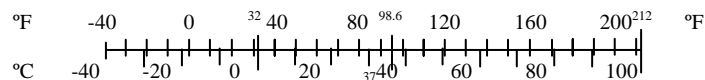
METRIC CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO METRIC MEASURES

SYMBOL	WHEN YOU KNOW	MULTIPLY BY LENGTH	TO FIND	SYMBOL
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
AREA				
in ²	square inches	645.2	square millimeters	mm ²
ft ²	square feet	0.093	square meters	m ²
yd ²	square yards	0.836	square meters	m ²
mi ²	square miles	2.59	square kilometers	km ²
ac	Acres	0.405	hectares	ha
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb.)	0.907	Megagrams	Mg
VOLUME				
fl oz	fluid ounces	29.57	milliliters	ml
gal	gallons	3.785	liters	l
ft ³	cubic feet	0.028	cubic meters	m ³
yd ³	cubic yards	0.765	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

APPROXIMATE CONVERSIONS FROM METRIC MEASURES

SYMBOL	WHEN YOU KNOW	MULTIPLY BY LENGTH	TO FIND	SYMBOL
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
AREA				
mm ²	square millimeters	0.0016	square inches	in ²
m ²	square meters	10.764	square feet	ft ²
m ²	square meters	1.195	square yards	yd ²
km ²	square kilometers	0.386	square miles	mi ²
ha	hectares (10,000 m ²)	2.47	acres	ac
MASS				
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg	Megagrams (1000 kg)	1.103	short tons	T
VOLUME				
ml	milliliters	0.034	fluid ounces	fl oz
l	liters	0.264	gallons	gal
m ³	cubic meters	35.314	cubic feet	ft ³
m ³	cubic meters	1.307	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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Qualified Product Lists

The following pages contain lists, which are directly referenced in the standard specifications as Approved Products Lists. These lists will be updated annually, and no product may be used in these categories unless it is shown on an appropriate list.

Chemical Anchors:

SPECIFICATION: Form 816, M.03.01-15

PREAPPROVAL CRITERIA: ASTM E-1512 pullout test by an independent laboratory.

SUPPLIER/LOCATION	BRAND NAME
A & P Foglia, Inc. 14 Hickory Drive East Brunswick, NJ 08816	Magnabond
Covert Operations Inc. 1940 Freeman Avenue Signal Hill, CA 90755 www.covertoperationsinc.com	CIA Gel 7000
Dayton Superior Chemical Division 4226 Kansas Avenue Kansas City, Kansas 66106 www.daytonsuperiorchemical.com	Sure Anchor I (J-51) ResCon 304 (Symons) Highway Fast Set Epoxy (AHT)
Fosroc, Inc. 150 Carley Court Georgetown, KY 40324 www.minovausa.com	Thoroc Anchor Bond Thoroc Anchortite
Hilti, Inc. P.O. Box 21148 Tulsa, OK 74121 www.us.hilti.com	Hilti HIT HY 150 Hilti HVA Capsules Hilti R.E. 500
ITW Ramset/Red Head 1300 North Michael Drive Wood Dale, IL 60191 www.ramset-redhead.com	Epcon Acrylic 7 Epcon Ceramic 6 Granite 5
Kelken Construction Systems P.O. Box 284 Parlin, NJ 08859 www.kelken.com	Kelibond Anchors KeligROUT KeligROUT 101
MKT Fastening LLC #1 Gunnebo Drive Lonoke, AR 72086 www.mktfastening.com	Liquid Roc 300 28oz. Twin Tube Liquid Roc 300 Polyester Pump Liquid Roc 300 Capsule Anchors Liquid Roc 500 Epoxy Twin Tube
Polygem, Inc. 1105 Carolina Ave. West Chicago, IL 60185 www.polygem.com	Polybac 1257

Continued on Next Page:

Qualified Product Lists - continued**Chemical Anchors:****SPECIFICATION:** Form 816, M.03.01-15**PREAPPROVAL CRITERIA:** ASTM E-1512 pullout test by an independent laboratory.

SUPPLIER/LOCATION	BRAND NAME
Powers Fasteners Inc. 2 Powers Square New Rochelle, NY 10801 www.powers.com	Power-Fast Epoxy AC-100 PLUS Chem-Stud
Sika Corporation 201 Polito Ave. Lyndhurst, NJ 07071 www.sika.com	Sikadure Injection Gel
Simpson StrongTie Anchoring Systems 4120 Dublin Boulevard, Suite 400 Dublin, CA 94568 www.simpsonanchors.com	Simpson Strong-Tie Epoxy-Tie Simpson Strong-Tie Acrylic-Tie
Unisorb Installation Technologies P.O. Box 1000 Jackson, MI 49204-1000 www.unisorb.com	Unisorb Capsule Anchor
Unitex 3101 Gardner Kansas City, MO 64120 www.unitex-chemicals.com	Propoxy 300 Fast Pro-Poxy 300 Sonneborn Epogel (ChemRex Inc.)
Adhesives Technology Corp. 450 East Copans Road Pompano Beach, FL 33064 www.ATC.com	Anchor-It HS200 Anchor-It HR200 (discontinued May 2005) Ultra Bond 1300 Ultra Bond 1 Ultra Bond 2
W.R. Meadows, Inc. 300 Industrial Drive Hampshire, IL 60140 www.wrmeadows.com	Sealtight Rezi-Weld Gel Paste UCE

Qualified Product Lists - continued

Erosion Control Matting:

SPECIFICATION: Form 816 Section 9.50 & M.13.09

PREAPPROVAL CRITERIA: See below

In general, organic materials are cheaper than synthetics, will photo-degrade after a period of time leaving a naturally vegetated channel, and are adequate for channels which are expected to carry storm water flows not exceeding 95.76 Pa shear stress. Synthetic materials generally do not photo-degrade and often remain as a permanent element within a drainage channel. Although more expensive, synthetic materials are generally best for critical channels which will carry high flows or velocities of storm water runoff.

Minimum Performance Standards

Erosion control matting is evaluated for use in eight Types, grouped in two Classes. In order for a product to be placed upon the Department's Approved Products List, it must meet the following Minimum Performance Standards.

CLASS 1: Slope Protection - Classification is based upon steepness of slope and soil type. The purpose is to protect the seed bed from loss of sediment, and promote the establishment of a warm season, perennial vegetative cover.

- Type A. Slopes 3:1 or Flatter - Clay Soils
- Type B. Slopes 3:1 or Flatter - Sandy Soils
- Type C. Slopes Steeper than 3:1 - Clay Soils
- Type D. Slopes Steeper than 3:1 - Sandy Soils

Minimum Acceptable Vegetation Density Standards¹

	<u>Clay Soils</u>	<u>Sandy Soils</u>
Slopes 3:1 or Flatter	80%	70%
Slopes steeper than 3:1	80%	70%

Minimum Acceptable Sediment Loss Standards (kg/10 m²)¹

	<u>Clay Soils</u>	<u>Sandy Soils</u>
Slopes 3:1 or Flatter	0.35	12.00
Slopes steeper than 3:1	0.35	27.00

CLASS 2: Flexible Channel Liner Protection - Classification is based upon the permissible shear stress_p present. The purpose is to protect the geometry of the channel from loss of sediment, and to promote the establishment of a warm-season, perennial vegetative cover.

- Type E. Permissible shear stress: <25 Pa
- Type F. Permissible shear stress: 25 to <50 Pa
- Type G. Permissible shear stress: 50 to <100 Pa
- Type H. Permissible shear stress: ≥100 Pa

T_p , the permissible shear stress, indicates the force required to initiate the movement of the lining material.

Minimum Acceptable Vegetation Density Standards¹

70%

Minimum Acceptable Sediment Loss Standards¹

	<u>Average Soil Deformation (cm)</u>
Shear Stress 1 to 100 Pa	1.15
Shear Stress > 100 Pa	1.00

Qualified Product Lists - continued

Erosion Control Matting:

SPECIFICATION: Form 816, Section 9.50 & M.13.09

PREAPPROVAL CRITERIA: It should be recognized that those products listed by brand or trade name on the Approved Products List have demonstrated their ability to meet or exceed the Department's minimum Performance standards. It is the Contractor's option as to which product he or she actually uses on a project, provided that the product used is on the Approved Products List for that application.

It will be the district's responsibility to verify that the Erosion Control Matting proposed by the Contractor is, in fact, listed as an acceptable product on the Approved Products List.

It should also be recognized that the decision to undergo testing for possible approval rests solely with the manufacturers or distributors of Erosion Control Matting. The Department has created a fair but rigorous testing process for Erosion Control Matting. The Department does not choose or stipulate which products are to be tested.

The Department's position is that, while we encourage the evaluation of new products for possible use in our operations, we cannot utilize a product which has not been tested and approved through the Department's evaluation process.

As new products are tested on an annual basis, those meeting our requirements will be added to the Approved Products List. If, by the time actual field installation of Erosion Control Matting commences on a project, new products have been added to the Approved Products List, the Contractor may elect to use these newly approved products even though they were not an "approved" product at the time bids were received on the project.

¹ Final Performance Analysis - 1995 Evaluation Cycle, Texas DOT/Texas Transportation Institute, Hydraulics and Erosion Control Laboratory, February, 1996.

² Shear Stress ranges based on values published in FHWA Hydraulic Engineering Circular No. 15 (HEC-15), Design of Roadside Channels with Flexible Linings, Publication No. FHWA-ZP-87-7, April 1988.

Qualified Product Lists - continued

Erosion Control Matting:

SPECIFICATION: Form 816, Section 9.50 & M.13.09

PREAPPROVAL CRITERIA: Certified Test Report

	CLASS 1: SLOPE PROTECTION *				CLASS 2: FLEXIBLE CHANNEL LINER PROTECTION			
	TYPE A	TYPE B	TYPE C	TYPE D	TYPE E *	TYPE F *	TYPE G *	TYPE H **
American Excelsior Co. 850 Avenue H East Arlington, TX 76011 www.amerexcel.com	Curlex: III I QuikGrass QuikMow	Curlex: III I QuikGrass QuikMow	Curlex: III I QuikGrass QuikMow	Curlex: III I QuikGrass QuikMow	Curlex: III	Curlex: III		
Belton Industries 8613 Roswell Rd. Suite 200 Atlanta, GA 30350 www.beltonindustries.com		Geocoir/ DeKoWe 700 900		Geocoir/ DeKoWe 700 900				
Contech Construction Products, Inc. 265 Highland Avenue Cheshire, CT 06410 www.contech-cpi.com	Contech: Ero-Mat Ero-Mat Standard High-Velocity Ero-Mat	Contech: Ero-Mat Ero-Mat Standard	Contech: High-Velocity Ero-Mat					
Conwed Fibers 219 Simpson Street Conover, NC 28613 www.conwedfibers.com	Futerra Mat	Futerra Mat						
Greenstreak Group Inc. 3400 TreeCourt Industrial Blvd. St. Louis, MO 63122 www.greenstreak.com	Pec-Mat	Pec-Mat					Pec-Mat	Pec-Mat

* Products listed in this category are generally temporary (bio- or photo-degradable). Exceptions are noted.

** Products listed in this category are generally permanent (non-bio- or non-photo-degradable). Exceptions are noted

TYPE E - Generally includes, but is not limited to, Woven Paper Net, Jute Net.

TYPE F - Generally includes, but is not limited to, Fiberglass Roving (single or double).

TYPE G - Generally includes, but is not limited to, Straw with Net, Curled Wood Mat.

TYPE H - Generally includes, but is not limited to, Synthetic Net.

Qualified Product Lists - continued

Erosion Control Matting:

SPECIFICATION: Form 816, Section 9.50 & M.13.09

PREAPPROVAL CRITERIA: Certified Test Report

	CLASS 1: SLOPE PROTECTION *				CLASS 2: FLEXIBLE CHANNEL LINER PROTECTION			
	TYPE A	TYPE B	TYPE C	TYPE D	TYPE E *	TYPE F *	TYPE G *	TYPE H **
North American Green 14649 Highway 41 North Evansville, IN 47711 www.nagreen.com	S150 S150BN SC150 SC150BN S75 S75BN	S150 S150BN SC150 SC150BN S75 S75BN	S150 S150BN SC150 SC150BN	S150 S150BN SC150 SC150BN C125 C125BN	P300 C125 C125BN	P300	P300	P300 C350 (Contains biodegradable component)
PPS Packaging Co. P.O. Box 427 3189 E. Manning Blvd. Fowler, CA 93625	Xcel: Regular Superior	Xcel: Regular Superior	Xcel: Superior	Xcel: Superior	Xcel: SuperDuty	Xcel: SuperDuty		
SI Geosolutions (formally known as Synthetic Industries) 6025 Lee Highway Chattanooga, TN 37421 www.fixsoil.com	Landlok: TRM435 S1 S2 CS2 (unseeded)	Landlok: TRM 435 S1 S2 CS2 (unseeded)	Landlok: TRM 435 C2 S2 CS2 (unseeded)	Landlok: TRM 435 C2 S2 CS2 (unseeded)	Landlok: TRM 435 TRM1060 TRM 450 (both permanent) C2	Landlok: TRM 435 TRM 1060 TRM 450 (both permanent) C2	Landlok: TRM 435 TRM 1060 TRM 450 (both permanent) C2	Landlok: TRM 435 TRM 1060 TRM 450 (both permanent) Pyramat SFB 12
Verdyol Alabama, Inc. P.O. Box 605 407 Miles Parkway Pell City, AL 35125	Ero-Mat: Standard Excelsior: Standard High-Velocity	Ero-Mat: Standard Excelsior: Standard	Excelsior: High-Velocity					

- Products listed in this category are generally temporary (bio- or photo-degradable). Exceptions are noted.

** Products listed in this category are generally permanent (non-bio- or non-photo-degradable). Exceptions are noted.

TYPE E - Generally includes, but is not limited to, Woven Paper Net, Jute Net.

TYPE F - Generally includes, but is not limited to, Fiberglass Roving (single or double).

TYPE G - Generally includes, but is not limited to, Straw with Net, Curled Wood Mat.

TYPE H - Generally includes, but is not limited to, Synthetic Net.

Qualified Product Lists - continued

Geotextiles:

SPECIFICATION: Form 816, Sections 2.19.02, 7.51, 7.55 and M.08.01-26

PREAPPROVAL CRITERIA: Certified Test Report According to AASHTO M 288

The following list denotes those geotextiles which are approved for use on ConnDOT projects. The categories listed are in accordance with the AASHTO M 288 specification. Geotextile selection shall be based on the following definitive information and the applicable design criteria.

1. **Subsurface Drainage** - Geotextiles within this category shall be used for, but not limited to the following applications: pavement edge drains; interceptor drains; wall drains; recharge basins and relief wells. The geotextile shall be designed to allow the passage of water normal to its surface while retaining in situ soil without clogging. Class A drainage applications for fabrics are where installation stresses are more severe than Class B applications; i.e., very coarse, sharp, angular aggregate is used; a heavy degree of compaction (95% or greater by AASHTO method T 99) is specified; or depth of trench is greater than 3.00 m. Class B drainage applications are those where the fabric is used with smooth graded surfaces having no sharp angular projections no sharp angular aggregate is used; compaction requirements are light (less than 95% by AASHTO method T 99); and trenches are less than 3.00 m in depth.
2. **Sediment Control** - Geotextiles within this category shall be used as a barrier-fence designed to remove suspended particles from the water that passes through it. "Wire Supported" signifies that fabric is supported with a mesh made of wire or plastic.
3. **Erosion Control** - Geotextiles within this category shall be used for, but not limited to the following applications: cut and fill slope protection; protection of various small drainage structures and ditches, wave protection for causeways and shore line roadway embankments and scour protection for structures such as bridges and abutments. The geotextile shall be designed to allow the passage of water while retaining in situ soil without clogging. Class A erosion control applications are those where the fabrics are used under conditions where installation stresses are more severe than Class B, i.e., aggregate placement height should be less than 1.00 m and aggregate weights should not exceed 115.00 kg. Class B erosion control applications are those where the fabric is used in structures or under conditions where the fabric is protected by a sand cushion or by "zero drop height" placement of aggregate.
4. **Separation** - Geotextiles within this category shall be used for but are not limited to the following applications: separation of dissimilar materials such as subgrades and pavement base courses and zones in embankments, foundations and select fill materials. When soil stabilization is the primary concern, the Design Engineer is cautioned that a detailed process must be followed, taking into consideration not only the separation properties of the geotextile, but its reinforcement function as well. The geotextile shall be designed to allow the passage of water while retaining in situ soil without clogging.

Qualified Product Lists - continued

Geotextiles:

SPECIFICATION: Form 816, Sections 2.19.02, 7.51, 7.55 and M.08.01-26

PREAPPROVAL CRITERIA: Certified Test Report According to AASHTO M 288

	SUBSURFACE DRAINAGE		SEDIMENT CONTROL		EROSION CONTROL		SEPARATION	
	Class A	Class B	Wire Supported	Self Supported	Class A	Class B	High Surviv.	Medium Surviv.
American Engineering Fabrics, Inc. 1 Coffin Ave. New Bedford, MA 02746 www.boomenviro.com	AEF: 880 1080 1280 600W 650W 200W 300W	AEF: 480 480HS 680 880 1080 1280 600W 650W 200W 300W 100W 130W 150W	AEF: 180W	AEF: 100W 150W 180W	AEF: 880 1080 1280 650W 300W	AEF: 480 480HS 680 880 1080 1280 650W 300W 100W 180W	AEF: 1080 1280 300W	AEF: 880 1080 1280 600W 200W 300W
Propex Fabrics Inc. 260 The Bluffs Austell, GA 30168 www.geotextile.com	ProPex 1199 2000 2019 4552 4553 4510 4512 4516	ProPex 4535 4545 4546 4547 4550 4551 4552 4553 4510 4512 4516		ProPex 2130	PrePex 1199 2002 * 2006 * 2019 4553 4510 4512 4516	ProPex 1199 2002 * 2006 * 2019 4545 4546 4547 4551 4553 4510 4512 4516	ProPex 2006 * 2016 * 4552 4553 4510 4512 4516	ProPex 2002 2006 * 2016 * 4547 4550 4551 4552 4553 4510 4512 4516

* Product is satisfactory only where the affected soil contains less than 50% material, by weight, passing the number 200 sieve.

Qualified Product Lists - continued

Geotextiles:

SPECIFICATION: Form 816, Sections 2.19.02, 7.51, 7.55 and M.08.01-26

PREAPPROVAL CRITERIA: Certified Test Report According to AASHTO M 288

	SUBSURFACE DRAINAGE		SEDIMENT CONTROL		EROSION CONTROL		SEPARATION	
	Class A	Class B	Wire Supported	Self Supported	Class A	Class B	High Surviv.	Medium Surviv.
Belton Industries, Inc. P.O. Box 127 Belton, SC 29627 www.boomenviro.com	768 769 977 1475	307 308 751 768 769 977 1475	940	307 940	769 1475	307 769 940 1475	1475	768 977 1475
First Line Corp. P.O. Box 68 Pearson, GA 31642			CSF 330	CSF 330				
Carthage Mills 4243 Hunt Road Cincinnati, OH 45242 www.carthagemills.com	FX-75NW Carthage-6%	FX-35HS FX-40HS FX-35NW FX-40NW FX-75NW Carthage-6%	FX-11	FX-11	FX-75NW FX-55 * FX-66 Carthage-6%	FX-35HS FX-40HS FX-35NW FX-40NW FX-33 FX-44 FX-75NW FX-55 * FX-66 Carthage-6%	FX-66 FX-75NW	FX-55 * FX-66 FX-75NW
DGI Industries P.O. Box 16522 Hooksett, NH 03442 www.dgiindustries.com			CT138036 CT213036	CT138036 CT213036				
Evergreen Technologies Inc. (Div. of Tensar) 200 Miller Sellers Dr. Evergreen, AL 36401	TG650	TG650 TG500 TG420 *	TG420	TG550	TG700	TG700 TG500 TG420 *	TG650	TG650 TG500

* Product is satisfactory only where the affected soil contains less than 50% material, by weight, passing the number 200 sieve.

Qualified Product Lists - continued

Geotextiles:

SPECIFICATION: Form 816, Sections 2.19.02, 7.51, 7.55 and M.08.01-26

PREAPPROVAL CRITERIA: Certified Test Report According to AASHTO M 288

	SUBSURFACE DRAINAGE		SEDIMENT CONTROL		EROSION CONTROL		SEPARATION	
	Class A	Class B	Wire Supported	Self Supported	Class A	Class B	High Surviv.	Medium Surviv.
A.H. Harris & Sons, Inc. P.O. Box 311058 367 Alumni Road Newington, CT 06131 www.ahharris.com			Harris Siltfence	Harris Siltfence				
Hoechst Celanese Corp. P.O. Box 5650 Spartanburg, SC 29304-5650			Trevira: 011/140			Trevira: 011/140		Trevira: 011/200
LINQ Industrial Fabrics, Inc. 4550 W. Fifth North St. Summerville, SC 29483 Attn: Warren Johnson	180EX 225EX 250EX 275EX 350EX	180EX 125EX 130EX 150EX 225EX 250EX 275EX 350EX	180 102 104 105	180 102 104 105	180EX 225EX 250EX 275EX 350EX GTF 400E	180EX 125EX 130EX 150EX 225EX 250EX 275EX 350EX GTF 400E	180EX 225EX 250EX 275EX GTF 300 * 350#X Typar: 3631	180EX GTF 200S GTF 200 * GTF 300 * 130EX 150EX 225EX 250EX 275EX 350EX
Mutual Industries Inc. 707 West Grange Street Philadelphia, PA 19120			MISF 1830 MISF 1855	MISF 1830 MISF 1855				
OnSite Systems, Inc. P.O. Box 241166 Charlotte, NC 28224			WCF 120	WCF 120	WCF 200	WCF 150 WCF 200	WCF 300	WCF 200 WCF 300
BBA Fiberweb Inc. 70 Old Hickory Blvd. Old Hickory, TN 37138 www.bbafiberweb.com		Typar: 3401G	Typar: 3401G	Typar: 3401G		Typar: 3401G	Typar: 3631G	Typar: 3401G

* Product is satisfactory only where the affected soil contains less than 50% material, by weight, passing the number 200 sieve.

Qualified Product Lists - continued

Geotextiles:

SPECIFICATION: Form 816, Sections 2.19.02, 7.51, 7.55 and M.08.01-26

PREAPPROVAL CRITERIA: Certified Test Report According to AASHTO M 288

	SUBSURFACE DRAINAGE		SEDIMENT CONTROL		EROSION CONTROL		SEPARATION	
	Class A	Class B	Wire Supported	Self Supported	Class A	Class B	High Surviv.	Medium Surviv.
Synthetic Industries 4019 Industry Drive Chattanooga, TN 37416 www.fixsoil.com	Geotex: 701 200ST	Geotex: 311 200ST		Geotex: 117F	Geotex: 801 200ST 104F	Geotex: 351 200ST 104F	Geotex: 701 315ST	Geotex: 451 200ST
TC Mirafi 365 South Holland Drive Pendergrass, GA 30567 www.mirafi.com	FW 401 FW 404 FW 500 FW 700	FW 401 FW 404 FW 500 FW 700 140N 140NL 135N 140NC	FW 401 FW 500 100X FW 700	FW 401 FW 404 FW 500 FW 700 100X Enviro-Fence	FW 401 FW 404 FW 500 FW 700 600X *	FW 401 FW 404 FW 500 FW 700 140N 140NL 600X *	HP 370 FW 404 FW 500 FW 700 600X *	FW 401 FW 500 FW 700 140N 500X * 550X 600X *
TNS Advanced Technologies Inc. 681 DeYoung Road Greer, SC 29651	R070 R080	R031 R035 R040 R042	R035		R080	R035 R040 R042	R070 R080	R042
Webtec, Inc. P.O. Box 240302 Charlotte, NC 28224	Terratex: EP NO8	Terratex: SD NO4 EP NO8 SO4	Terratex: SC SC-90	Terratex: SC SC-90	Terratex: GS * NO8	Terratex: SD NO4 GS-150 * GS * NO8	Terratex: HD * EP	Terratex: GS * NO8 HD * EP

* Product is satisfactory only where the affected soil contains less than 50% material, by weight, passing the number 200 sieve.

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Qualified Product Lists - continued

Impact Attenuation Systems:

SPECIFICATION: Form 816 Section 18.00 thru 18.07

PREAPPROVAL CRITERIA: Crash Tested in accordance with National Cooperative Highway Research (NCHRP) Report 350 - Recommended Procedures for the Safety Performance Evaluation of Highway Features Test Level 3 criteria and written approval from FHWA for use on National Highway System roads.

Comments: For all attenuators, see the [ConnDOT Highway Design Manual](#) for guidance.

System	Manufacturer/ Distributor	W-beam End Terminal	Crash Cushion	Hazard Location	Trans. To Rigid System Required	Std. Width	Std. Length	Deck Structure Required	Bi-direct Capable	Redirect Capable
TYPE A IMPACT ATTENUATION SYSTEMS										
FITCH UNIVERSAL MODULE BARRELS	Distributed by TRANSCO 1-800-321-7870	No	Yes	Roadside, Median & Gore	No	6.5' - ∞	18'-40'	No	Yes	No
ENERGITE III (BARRELS)	Distributed by TRANSCO 1-800-321-7870	No	Yes	Roadside, Median & Gore	No	6.5' - ∞	18'-40'	No	Yes	No
TYPE B IMPACT ATTENUATION SYSTEMS (TANGENTIAL)										
SKT-350	Distributed by Road Systems Inc. 1-815-464-5917	Yes	No	Roadside and *Median	Yes	2'	50'	No	Yes only if head of system is placed outside clear zone for opposing direction of traffic	Yes
ET-2000	Manufactured by Syro/Trinity 1-800-321-2755	Yes	No	Roadside and *Median	Yes	2'	50'	No	Yes only if head of system is placed outside clear zone for opposing direction of traffic	Yes
BEAT	Distributed by Road Systems Inc. 1-815-464-5917	No	No	Roadside	Yes	6" Box Beam with Impact Head at a 50:1 offset	27'-6"	No	Yes only if head of system is placed outside clear zone for opposing direction of traffic	Yes
WY-BET	Manufactured by Syro/Trinity 1-800-321-2755	No	No	Roadside	Yes	6" Box Beam with Impact Head at a 50:1 offset	48'-2"	No	Yes only if head of system is placed outside clear zone for opposing direction of traffic	Yes

Qualified Product Lists - continued

Impact Attenuation Systems:

SPECIFICATION: Form 816 Section 18.00 thru 18.07

PREAPPROVAL CRITERIA: Crash Tested in accordance with National Cooperative Highway Research (NCHRP) Report 350 - Recommended Procedures for the Safety Performance Evaluation of Highway Features Test Level 3 criteria and written approval from FHWA for use on National Highway System roads.

Comments: For all attenuators, see the [ConnDOT Highway Design Manual](#) for guidance.

System	Manufacturer/Distributor	W-beam End Terminal	Crash Cushion	Hazard Location	Trans. To Rigid System Required	Std. Width	Std. Length	Deck Structure Required	Bi-direct Capable	Redirect Capable
TYPE B IMPACT ATTENUATION SYSTEMS (FLARED)										
SRT-350 (Ross-350)	Manufactured by Syro/Trinity 1-800-321-2755	Yes	No	Roadside and *Median	Yes	3'	37.5'	No	No	Yes
FLEAT 350	Distributed by Road Systems Inc. 1-815-464-5917	Yes	No	Roadside and *Median	Yes	2'	37.5'	No	No	Yes
TYPE B IMPACT ATTENUATION SYSTEMS (MEDIAN/GORE)										
BRAKE-MASTER	Distributed by TRANSPO 1-800-321-7870	Yes	Yes	Roadside, *Median and Gore	Yes	2'	32'-8"	Yes	Yes	Yes
C-A-T	Manufactured by Syro/Trinity 1-800-321-2755	Yes	Yes	Roadside, Median and Gore	Yes	2.3'	30'	No	Yes	Yes
ADIEM 350	Manufactured by Syro/Trinity 1-800-321-2755	No	Yes	Roadside, Median and Gore	Yes	2.33'	30'	Yes	Yes	Yes
BEAT-MT	Distributed by Road Systems Inc. 1-815-464-5917	No	No	Roadside, Median and Gore	Yes	8" Box Beam with Impact head at a 50:1 offset	32'-3"	No	No	Yes
WY-BET (MD)	Manufactured by Syro/Trinity 1-800-321-2755	Box Beam Terminal	No	Roadside, Median and Gore	Yes	8" Box Beam with Impact head at a 50:1 offset	48'-2"	No	No	Yes

Qualified Product Lists - continued

Impact Attenuation Systems:

SPECIFICATION: Form 816 Section 18.00 thru 18.07

PREAPPROVAL CRITERIA: Crash Tested in accordance with National Cooperative Highway Research (NCHRP) Report 350 - Recommended Procedures for the Safety Performance Evaluation of Highway Features Test Level 3 criteria and written approval from FHWA for use on National Highway System roads.

Comments: For all attenuators, see the [ConnDOT Highway Design Manual](#) for guidance.

System	Manufacturer/Distributor	W-beam End Terminal	Crash Cushion	Hazard Location	Trans. To Rigid System Required	Std. Width	Std. Length	Deck Structure Required	Bi-direct Capable	Redirect Capable
TYPE B IMPACT ATTENUATION SYSTEMS (NON-GATING)										
React 350 Family	Distributed by TRANSPO 1-800-321-7870	Yes	Yes	Roadside, Median & Gore	Yes	3' to 10'	15.5' to 30.5'	Yes	Yes	Yes
QUADGUARD Family	Distributed by TRANSPO 1-800-321-7870	Yes	Yes	Roadside, Median & Gore	Yes	2' to 7.5'	5.7' to 38.7'	Yes	Yes	Yes
TAU 11	Barrier Systems 1-856-424-8186	Yes	Yes	Roadside, Median & Gore	Yes	2'	5.3' to 28'	Yes	Yes	Yes
TRACC	Manufactured by Syro/Trinity 1-800-321-2755	Yes	Yes	Roadside, Median & Gore	Yes	2.6'	20'	Yes	Yes	Yes
TYPE C or NC IMPACT ATTENUATION SYSTEMS										
CIAS	Ram Welding Co. Naugatuck, CT 1-203-729-2289	No	Yes	Roadside, Median & Gore	Back up Support Required	6.5'	18.25'	Yes	Yes	Yes
NCIAS	Ram Welding Co. Naugatuck, CT 1-203-729-2289	No	Yes	Roadside, Median & Gore	Back up Support Required	3'	30' yes	Yes	Yes	Yes

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Qualified Product Lists - continued

Penetrating Sealer Protective Compound - Clear or Pigmented:

SPECIFICATION: Form 816, M.03.02 & M.03.01-11

PREAPPROVAL CRITERIA: Independent laboratory test results per NCHRP 244
for northern climates

TYPES OF SEALER - Each product will be assigned a category based on its physical characteristics, as follows:

P - Pigmented. Not necessarily white. Overcoat for clear.

C - Clear. Intended for use on structure wing walls, beam seats, inside faces of parapets, or as called for by the engineer. Requires pigmented sealant overcoat.

W - White. Intended for use on Jersey barrier or when called for by the engineer.

BRAND NAME	TYPE	SUPPLIER/LOCATION
Tamms Industries 3835 State Route 72 Kirkland, IL 60146	C	Baracade 16 (Formerly SMS-250 and Chemstop SMS-250)
Vexcon Chemicals 7240 State Road Philadelphia, PA 19135 www.vexcon.com	C,P	Certi-Vex Enflo Smooth VOC Certi-Vex Enflo Tex VOC Certi-Vex Powerseal 40%
Sivento, Inc. 65 Challenger Road Ridgefield Park, NJ 07660	C	CHEM-TRETE BSM 40 VOC Dynasytan BH-N
ProSoCo, Inc. 3741 Greenway Circle Lawrence, KS 66046 www.prosoco.com	C	Consolideck Saltguard WB
Princeton Chemical, Inc. P.O. Box 132 Lincoln, RI 02865	C	Crete-Shield
Degussa Building Systems 889 Valley Park Drive Shakopee, MN 55379 www.DegussaBuildingSystems.com	C,P	Enviroseal 20 Enviroseal 40 Masterseal SL40 VOC
Watson-Bowman & Acme 95 Pineview Drive Amherst, NY 14228	C,P	WABO HorseySet WDE
Modac Products Co. 600 Reed Road Broomall, PA 19008 www.modacproducts.com	C,P	Modac F
Advanced Chemical Technologies 100 W. Wilshire Blvd. Oklahoma City, OK 73116 www.advchemtech.com	C	Sil-Act ATS-42
Nox-crete Products Group P.O. Box 8102 Omaha, NE 68108 www.NOX-CRETE.com	C	Stifel-S

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Qualified Product Lists - continued:**Reflective Sheeting Type I**

SPECIFICATION: Standard Specifications Section M.18.09.01 and a Materials Certificate Submission conforming to Standard Specifications Section 1.06.07.

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) 3-year Reflective Sheeting Test Deck.

Sheet Signs - Aluminum

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3200 Series 3290 White 3271 Yellow 3272 Red 3275 Blue 3277 Green 3279 Brown
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3260 Series 3260 White 3261 Yellow 3262 Red 3264/3284 Orange 3265 Blue 3267 Green 3269 Brown
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	1484 Orange CW84
Avery Dennison Reflective Films Division 6565 West Howard Street Niles, IL 60714	Avery Dennison: T-1500/T-1600 Series T-1000/T-1600 White T-1501/T-1601 Yellow T-1504/T-1604 Orange T-1505/T-1605 Blue T-1507/T-1607 Green T-1408/T-1608 Red (i.e. Stop Sign Red) T-1509/T-1609 Brown
Nippon Carbide Industries Inc. 3136 East Victoria Street Rancho Dominguez, CA 90221	Nikkalite: 7100/8100 Series 7112/8112 White 7105/8105 Red 7177/8177 Orange 7104/8104 Yellow 7106/8106 Blue 7108/8108 Green 7109/8109 Brown

Qualified Product Lists - continued:

Reflective Sheeting Type II

SPECIFICATION: Standard Specifications Section M.18.09.01 and a Materials Certificate submission conforming to Standard Specifications Section 1.06.07.

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) 3-year Reflective Sheeting Test Deck.

Sheet Signs - Aluminum

Supplier	Product
Avery Dennison Reflective Films Division 6565 West Howard Street Niles, IL 60714	Avery Dennison: T-2500/T-2600 Series T-2500/T-2600 White T-2501/T-2601 Yellow T-2504/T-2604 Orange T-2505/T-2605 Blue T-2507/T-2607 Green T-2508/T-2608 Red (i.e. Stop Sign Red) T-2509/T-2609 Brown
Nippon Carbide Industries Inc. 3136 East Victoria Street Rancho Dominguez, CA 90221	Nikkalite: 17000/18000 Series 17012/18012 White 17035/18035 Red 17037/15037 Orange 17004/18004 Yellow 17006/18006 Blue 17008/18008 Green 18009 Brown

Qualified Product Lists - continued

Reflective Sheeting Type III

SPECIFICATION: Standard Specifications Section M.18.09.01 and a Materials Certificate submission conforming to Standard Specifications Section 1.06.07.

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) 3-year Reflective Sheeting Test Deck.

Extruded Signs - Aluminum

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3800 Series 3870 Silver (White) 3871 Yellow 3872 Red 3875 Blue 3877 Green 3879 Brown
Avery Dennison Reflective Films Division 6565 West Howard Street Niles, IL 60714	Avery Dennison: T-5500 Series T-5500 White T-5501 Yellow T-5504 Orange T-5505 Blue T-5507 Green T-5508 Red(i.e. Stop Sign Red) T-5509 Brown
Nippon Carbide Industries Inc. 3136 East Victoria Street Rancho Dominguez, CA 90221	Nikkalite Brand Ultralite Grade II: 800/500 Series N812/N512 White N804/N504 Yellow N805/N505 Red N806/N506 Blue N807/N507 Orange N808/N508 Green N809/N509 Brown

Qualified Product Lists - continued

Reflective Sheeting Type III

SPECIFICATION: Standard Specifications Section M.18.09.01 and a Materials Certificate submission conforming to Standard Specifications Section 1.06.07.

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) 3-year Reflective Sheeting Test Deck.

Sheet Signs - Aluminum (Overhead)

Supplier	Product
Avery Dennison Reflective Films Division 6565 West Howard Street Niles, IL 60714	Avery Dennison: T-5500/T-6500 Series T-5500/T-6500 White T-5501/T-6501 Yellow T-5504/T-6504 Orange T-5505/T-6505 Blue T-5507/T-6507 Green T-5508/T-6508 Red T-5509/T-6509 Brown
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	2800/3800 Series 2870/3870 Silver (White) 2871/3871 Yellow 2872/3872 Red 2875/3875 Blue 2877/3877 Green 2879/3879 Brown
Nippon Carbide Industries Inc. 3136 East Victoria Street Rancho Dominguez, CA 90221	Nikkalite Brand Ultralite Grade II: 800/500 Series N812/N512 White N804/N504 Yellow N805/N505 Red N806/N506 Blue N807/N507 Orange N808/N508 Green N809/N509 Brown

Qualified Product Lists - continued

Reflective Sheeting Type III

SPECIFICATION: Standard Specifications Section M.18.09.01 and a Materials Certificate submission conforming to Standard Specifications Section 1.06.07.

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) 3-year Reflective Sheeting Test Deck.

Construction Signs Encapsulated Lens Substrate includes aluminum, plywood, plastic, masonite and roll-up signs.

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	2820/3820 Series 2820/3820 White 2821/3821 Yellow 2824/3824 Orange
Avery Dennison Reflective Films Division 6565 West Howard Street Niles, IL 60714	Avery Dennison: T-5500/T-6500 Series T-5500/T-6500 White T-5501/T-6501 Yellow T-5504/T-6504 Orange T-5505/T-6505 Blue T-5507/T-6507 Green T-5508/T-6508 Red T-5509/T-6509 Brown

Traffic Cone

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3810 White

Construction barricade substrate includes aluminum, plastic, and high impact Styrene.

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3810 Series 3810 White 3814 Orange
Avery Dennison Reflective Films Division 6565 West Howard Street Niles, IL 60714	Avery Dennison: T-5500/T-6500 Series T-5500/T-6500 White T-5504/T-6504 Orange
Nippon Carbide Industries Inc. 3136 East Victoria Street Rancho Dominguez, CA 90221	Nikkalite: N812/N512 White N807/N507 Orange

Qualified Product Lists - continued

Reflective Sheeting Type III

SPECIFICATION: Standard Specifications Section M.18.09.01 and a Materials Certificate submission conforming to standard Specifications Section 1.06.07.

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) 3-year Reflective Sheeting Test Deck.

Opposing Traffic Lane Divider (Flexible Sheeting)

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3810 Series 3814 Orange

Glare Screens

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3810 Series 3810 White 3811 Yellow

Posts and Tubular Markers

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3810 Series 3810 White 3811 Yellow 3814 Orange

Qualified Product Lists - continued

Reflective Sheeting Type IV

SPECIFICATION: Standard Specifications Section M.18.09.01 and a Materials Certificate submission conforming to standard Specifications Section 1.06.07.

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) 3-year Reflective Sheeting Test Deck.

Construction Signs Encapsulated Lens Substrate includes aluminum, plywood, plastic, masonite and roll-up signs.

Supplier	Product
Avery Dennison Reflective Films Division 6565 West Howard Street Niles, IL 60714	Avery Dennison: T-6500 Series T-6500 White T-6501 Yellow T-6504 Orange T-6505 Blue T-6507 Green T-6508 Red T-6509 Brown

Construction barricade substrate includes aluminum, plastic, and high impact Styrene.

Supplier	Product
Avery Dennison Reflective Films Division 6565 West Howard Street Niles, IL 60714	Avery Dennison: T-6500 Series T-6500 White T-6504 Orange

Qualified Product Lists - continued

Reflective Sheeting Type V

SPECIFICATION: Standard Specifications Section M.18.09.01 and a Materials Certificate submission conforming to Standard Specifications Section 1.06.07.

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) 3-year Reflective Sheeting Test Deck.

Delineators - Aluminum

Supplier	Product
Reflexite North America Post Office Box 1200 New Britain, CT 06050	AR 1000 Yellow
	AR 1000 White
	AP 1000 White
	AP 1000 Yellow
	AP 1000 Red

Reflective Sheeting Type VI

SPECIFICATION: Standard Specifications Section M.18.09.01 and a Materials Certificate submission conforming to Standard Specifications Section 1.06.07.

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) 3-year Reflective Sheeting Test Deck.

Construction Signs Encapsulated Lens Substrate includes Aluminum, plywood, plastic, masonite and roll up signs.

Supplier	Product
Reflexite North America Post Office Box 1200 New Britain, CT 06050	Orange Roll-Up Sign
	Fluorescent Orange Super Bright
	Roll-Up Sign

Traffic Cone

Supplier	Product
Reflexite North America Post Office Box 1200 New Britain, CT 06050	2010 Series
	2010 White Cone Collar

Qualified Product Lists - continued

Reflective Sheeting - Bright Wide Angle Retroreflective

SPECIFICATION: Form 816 Section M.18.09.02

PREAPPROVAL CRITERIA: Conformance to the following ConnDOT specification through Certified Test Reports.

1. Test Methods:

1.1 Test Conditions: Unless otherwise specified herein, all applied and unapplied test samples and specimens shall be conditioned at the standard conditions of $73 \pm 3^{\circ}\text{F}$ ($23 \pm 3^{\circ}\text{C}$) and $50 \pm 5\%$ relative humidity for 24 hours prior to testing.

Test Panels: Unless otherwise specified herein, when tests are to be performed using test panels, the specimens of retroreflective material shall be applied to smooth aluminum cut from ASTM B-209 Alloy 5052-H36, 5052-H38, 5154-H38 or 6061-T6 sheets in 0.020 inch (0.51 mm), 0.040 inch (1.0 mm) or 0.063 inch (1.6 mm) thickness. The aluminum shall be degreased and lightly acid etched before the specimens are applied. The specimens shall be applied to the panels in accordance with the recommendations of the retroreflective sheeting manufacturer.

2. Color Requirements:

Color	TABLE I Color Specification Limits* (Daytime)								Reflectance Limit Y (%)	
	1		2		3		4		Min.	Max.
	X	Y	X	Y	X	Y	X	Y		
White	0.305	0.305	0.355	0.355	0.335	0.375	0.285	0.325	40	-
Yellow	0.487	0.423	0.545	0.454	0.465	0.534	0.427	0.483	24	45
Red	0.690	0.310	0.595	0.315	0.569	0.341	0.655	0.345	3	15
Blue	0.078	0.171	0.150	0.220	0.210	0.160	0.137	0.038	1	10
Green	0.030	0.398	0.166	0.364	0.286	0.446	0.201	0.794	3	9

*The four pairs of chromaticity coordinates determine the acceptable color in terms of the CIE 1931 standard color-metric system measured with standard illuminant D65.

Color Test - Conformance to color requirements of Table I shall be determined by instrumental method in accordance with ASTM E 1164 on sheeting applied to aluminum test panels. The values shall be determined on a HunterLab Labscan 6000 0/45 Spectrocolorimeter with option CMR 559 [or approved equal 0.45 (45/0) instrument with circumferential viewing (illumination)]. Computations shall be done in accordance with ASTM E 308 for the 2 degree observer.

3. Coefficient of Retroreflection, RA: The coefficients of retroreflection shall not be less than the minimum values specified in Table II. Testing shall be in accordance with ASTM E 810. The observation angles shall be 0.2, 0.33, 0.5 and 1.0 degrees. Coefficients of retroreflection RA shall be specified in units of candelas per foot-candle per square foot (candelas per lux per square meter).

The datum mark (arrow) imprinted on the face of the sheeting shall be the datum mark for test purposes. The testing shall be performed at 0 degrees rotation unless otherwise noted. For the 0 degree rotation angle, the direction of the datum mark shall be parallel to the observation plane. For the 90 degree rotation angle the datum mark is perpendicular to the plane. It is recommended that signs are constructed with datum mark in a vertical position to maximize wide entrance angle performance.

For colored, transparent overlay films and for screen printed transparent color areas on white sheeting, the ratios of the RA for the white to the RA for the color, when measured at 0.2 degree observation, -4 degree entrance, and 0 degree rotation, shall be 5:1 to 15:1 for red, not less than 5:1 for blue and not less than 5:1 for green when processed in accordance with the sheeting manufacturer's recommendations.

Qualified Product Lists - continued

TABLE II

Minimum Coefficient of Retroreflection RA
Candelas per foot-candle per square foot
(Candelas per lux per square meter)

Observation Angle °	Entrance Angle °	Rotation Angle °	White	Yellow	Red	Blue	Green
0.20	-4	0	430	350	110	20	45
0.33	-4	0	300	250	75	15	33
0.50	-4	0	250	200	60	10	25
1.00	-4	0	80	65	20	4	10
0.20	30	0	235	190	60	11	24
0.33	30	0	150	130	30	7	18
0.50	30	0	170	140	40	7	19
1.00	30	0	50	40	13	2.5	5
0.20	40	90	150	125	40	6	15
0.33	40	90	85	75	25	4	8
0.50	40	90	35	30	10	1.5	3.5
1.00	40	90	20	17	6	0.7	2.0

4. **Gloss:** The retroreflective sheeting shall have an 85 degree specular gloss of not less than 50 when tested in accordance with ASTM D523.

5. **Color Processing:** The retroreflective sheeting shall permit cutting and color processing with compatible transparent and opaque process colors in accordance with the sheeting manufacturer's recommendations at temperatures of 59 to 100°F (15 to 38°C) and relative humidity of 20% to 80%. The sheeting shall be heat resistant and permit force curing without staining of applied or unapplied sheeting at temperatures recommended by the sheeting manufacturer.

6. **Flexibility:** The retroreflective sheeting with the liner removed and conditioned as in 1.1 shall be sufficiently flexible to show no cracking when slowly bent, in one second's time, around 0.125 inch (3 mm) mandrel, with the adhesive contacting the mandrel, at test conditions. Talcum powder shall be spread on the adhesive to prevent sticking to the mandrel.

7. **Adhesive:** The protective liner attached to the adhesive shall be removed by peeling without soaking in water or other solutions, without breaking, tearing, or removing any adhesive from the backing. The protective liner shall be easily removed following accelerated storage for 4 hours at 158°F (70°C) under a weight of 2.5 pounds per square inch (0.175 kg/cm²). The adhesive backing of the retroreflective sheeting shall produce a bond to support a 1.75 pound (0.80 kg) weight for 5 minutes without the bond peeling for a distance of more than 2.0 inches (50 mm) when applied to a test panel prepared as in 1.2. Apply 4 inches (100 mm) of a 1 inch (25 mm) x 6 inch (150 mm) specimen to a test panel. Condition and then position the panel face down horizontally, suspend the weight from the free end of the sample and allow it to hang free at an angle of 90 degrees to the panel surface for 5 minutes.

8. **Impact Resistance:** The retroreflective sheeting applied according to the sheeting manufacturer's recommendations to a test panel of alloy 6061-T6, 0.040 inch (1 mm) by 3 inch (75 mm) by 5 inch (125 mm) and conditioned as in 1.1, shall show no cracking outside the impact area when the face of the panel is subjected to an impact of 100 inch-pounds (11.3 N.m) using a weight with a 0.625 inch (16 mm) diameter rounded tip dropped from a height necessary to generate an impact of 100 inch-pounds (11.3 N.m), at test temperatures of both 32°F (0°C) and 72°F (22°C).

9. **Resistance to Accelerated Outdoor Weathering:** The retroreflective surface of the sheeting shall be weather resistant and show no appreciable cracking, blistering, crazing, or dimensional change after 2 years unprotected outdoor exposure, facing the equator and inclined 45 degrees from the vertical. Following weather exposure, panels shall be washed in a 5% HCL solution for 45 seconds, rinsed thoroughly with clean water, blotted with a soft cloth and brought to equilibrium at standard conditions. After cleaning, the coefficient of retroreflection shall not be less than the values in Table III when measured at 0 degree rotation and the colors shall conform to the requirements of Table I. The sample shall:

Qualified Product Lists - continued

9.1 Show no appreciable evidence of cracking, scaling, pitting, blistering, edge lifting or curling or more than 0.031 inch (800 um) shrinkage or expansion.

9.2 Be measured only at angles of: 0.2 degree observation, -4 degree entrance, and 0 degree rotation; and 1.0 degree observation, -4 degree entrance, and 0 degree rotation. Where more than one panel of a color is measured, the coefficient of retroreflection shall be the average of all determinations.

TABLE III

Minimum Coefficient of Retroreflection RA after Accelerated Outdoor Weathering
Candelas per foot-candle per square foot (candelas per lux per square meter)

Color	Observation Angle °	Entrance Angle °	Rotation Angle °	Cd/fc/ft ² (cd/lx/m ²)
White	0.2	-4	0	250
	1.0	-4	0	45
Yellow	0.2	-4	0	200
	1.0	-4	0	35
Red	0.2	-4	0	60
	1.0	-4	0	12
Blue	0.2	-4	0	11
	1.0	-4	0	1.3
Green	0.2	-4	0	25
	1.0	-4	0	3

10. Resistance to Heat: The retroreflective sheeting, applied to a test panel and conditioned as in 1.1, shall be measured in accordance with 3 at 0.2 degree observation and -4 degree entrance angles and 0 degree rotation and exposed to 170 ± 5°F (77 ± 3°C) for 24 hours in an air circulating oven. After heat exposure, the sheeting shall retain a minimum of 70% of the original coefficient of retroreflection when measured at room temperature.

11. Resistance to Corrosion: The retroreflective sheeting applied to a test panel and conditioned as in 1.1, shall show no loss of adhesion, appreciable discoloration or corrosion and after cleaning shall retain a minimum of 80% of the original coefficient of retroreflection when measured at 0.2 degree observation, -4 degree entrance and 0 degree rotation angles after 1000 hours exposure to a 5% concentration salt spray at 95°F (35°C) when tested in accordance with ASTM B 117.

Reflective Sheeting - Bright Wide Angle Retroreflective

SPECIFICATION: Form 816 Section M.18.09.02

PREAPPROVAL CRITERIA: See previous ConnDOT specification.

Sheet Signs, Delineators, Extruded Signs - Aluminum

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3990 White 3991 Yellow 3992 Red 3995 Blue 3997 Green

Qualified Product Lists - continued

Reflective Sheeting Type VII

SPECIFICATION: Form 816 Section M.18.09.01

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) 3-year Reflective Sheeting Test Deck.

No applications at this time.

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3970 White 3971 Yellow 3972 Red 3975 Blue 3977 Green

Reflective Sheeting Type VIII

SPECIFICATION: Form 816 Section M.18.09.01

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) 3-year Reflective Sheeting Test Deck.

Sheet Signs - Aluminum Stop, 4-Way, Wrong Way, Do Not Enter, Guide Signs (7529)

Supplier	Product
Avery Dennison Reflective Products Division 6565 West Howard Street Niles, IL 60714	7000 Series 7500 White 7501 Yellow 7504 Orange 7505 Blue 7506 Green 7507 Red 7508 Brown 7529 Worboys Green

Qualified Product Lists - continued

Reflective Sheeting Type IX

SPECIFICATION: Form 816 Section M.18.09.01

PREAPPROVAL CRITERIA: Conformance to ASTM D4956 and participation in the National Transportation Product Evaluation Program (NTPEP) three-year evaluation for reflective sheeting.

Sheet Signs - Aluminum Stop, 4-Way, Wrong Way, Do Not Enter

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3990 White 3991 Yellow 3992 Red 3995 Blue 3997 Green

Traffic Drums - Plastic 42"/1 meter Traffic Cone

Supplier	Product
3M Company Traffic Safety Systems Div. 3M Center, Building 225-5S-08 Post Office Box 33225 St. Paul, MN 55133-3225	3910 Series 3910 White 3914 Fluorescent Orange
Avery Dennison Reflective Products Division 6565 West Howard Street Niles, IL 60714	WR-7100 Series 7100 White 7114 Fluorescent Orange

QUALIFIED PRODUCT REFERENCES (WITH ACCEPTANCE CRITERIA)

The categories listed below have products and or materials that have met the specific requirements of the Standard Specifications or project Special Provisions.

Antistripping Additives

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Nelio J. Rodrigues; Phone (860) 258-0326
Administrative Contact: Keith R. Lane

Acceptance Criteria: Form 816, M.04.03; AASHTO T182

Asphalt Plug Expansion Joints - Movement Capacity 1 ½" or less

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Nelio J. Rodrigues; Phone (860) 258-0326
Administrative Contact: Keith R. Lane

Acceptance Criteria: Special Provision; Prequalification Procedure.

Bearings - Pot, Spherical or Disc

RESPONSIBLE UNIT: Division of Bridge Design
Technical Contact: Ralph Daily, Jr.; Phone (860) 594-3312
Administrative Contact: James H. Norman

Acceptance Criteria: Recurring Special Provision

Channelizing Devices - Traffic Cones and Drums Type 1(purchased after 10/1/98)

RESPONSIBLE UNIT: Division of Traffic Engineering
Technical Contact: Charles S. Harlow; Phone (860) 594-2788
Administrative Contact: John F. Carey

Acceptance Criteria: 1. Catalog cut check for compliance with state specifications.
2. Manufacturer's self-certifying letter, stating NCHRP 350 testing requirements.

Coating Systems for New Steel

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: John Giannini; Phone (860) 258-0324
Administrative Contact: Keith R. Lane

Acceptance Criteria: Prequalification Procedure NEPCOAT

Elastomeric Concrete Expansion Joint Systems

RESPONSIBLE UNIT: Division of Bridge Design
Technical Contact: Ralph Daily, Jr.; Phone (860) 594-3312
Administrative Contact: James H. Norman

Acceptance Criteria: Special Provision; Prequalification Procedure

QUALIFIED PRODUCT REFERENCES (WITH ACCEPTANCE CRITERIA) - CONTINUED

Epoxy Injection Crack Repair

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Robert G. Lauzon; Phone (860) 258-0327
Administrative Contact: Keith R. Lane

Acceptance Criteria: Special Provision; Prequalification Procedure

Fast Setting High Strength Header Materials

RESPONSIBLE UNIT: Division of Bridge Design
Technical Contact: Ralph Daily, Jr.; Phone (860) 594-3312
Administrative Contact: James H. Norman

Acceptance Criteria: Special Provision; Prequalification Procedure

Field Coatings for Blast Cleaned Steel

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: John Giannini; Phone (860) 258-0324
Administrative Contact: Keith R. Lane

Acceptance Criteria: Prequalification Procedure NEPCOAT

Field Touch-Up Paint

RESPONSIBLE UNIT: Division of Bridge Design
Technical Contact: Ralph Daily, Jr.; Phone (860) 594-3312
Administrative Contact: James H. Norman

Acceptance Criteria: Special Provision; Prequalification Procedure

Grouts - Non-Shrink Cementitious

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Robert G. Lauzon; Phone (860) 258-0327
Administrative Contact: Keith R. Lane

Acceptance Criteria: Form 816, M.03.01-12

High Strength Patch Materials for Concrete Bridge Decks

RESPONSIBLE UNIT: Division of Bridge Design
Technical Contact: Ralph Daily, Jr.; Phone (860) 594-3312
Administrative Contact: James H. Norman

Acceptance Criteria: Special Provision; Prequalification Procedure

Offset Blocks for W-beam Guide Rail - Plastic

RESPONSIBLE UNIT: Division of Highway Design
Technical Contact: Monique Burns; Phone (860) 594-3292
Administrative Contact: James H. Norman

Acceptance Criteria: Recurring Special Provision; Prequalification

QUALIFIED PRODUCT REFERENCES (WITH ACCEPTANCE CRITERIA) - CONTINUED

Pavement Joint and Crack Sealants

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Nelio J. Rodrigues; Phone (860) 258-0326
Administrative Contact: Keith R. Lane

Acceptance Criteria: Form 816, M.04.02

Pile Point Reinforcement - Prefabricated

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Robert G. Lauzon; Phone (860) 258-0327
Administrative Contact: Keith R. Lane

Acceptance Criteria: ASTM A27

Pile Splicers - Prefabricated

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Robert G. Lauzon; Phone (860) 258-0327
Administrative Contact: Keith R. Lane

Acceptance Criteria: ASTM A36

Polypropylene (5A) & Polyester Fibers (5B)

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Nelio J. Rodrigues; Phone (860) 258-0326
Administrative Contact: Keith R. Lane

Acceptance Criteria: Form 816, M.04.03

Portland Cement Concrete

Air-Entraining Admixtures

High Range Water-Reducing Admixtures

Portland Cement

Retarders

Water-Reducing Admixtures

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Robert G. Lauzon; Phone (860) 258-0327
Administrative Contact: Keith R. Lane

Acceptance Criteria: Form 816, M.03.01-9

Prefabricated Expansion Joints - Movement Capacity Over 4"

RESPONSIBLE UNIT: Division of Bridge Design
Technical Contact: Ralph Daily, Jr.; Phone (860) 594-3312
Administrative Contact: James H. Norman

Acceptance Criteria: Special Provision; Prequalification Procedure

QUALIFIED PRODUCT REFERENCES (WITH ACCEPTANCE CRITERIA) - CONTINUED

Prefabricated Geocomposite Drain

RESPONSIBLE UNIT: Soils and Foundations Section
Technical Contact: Leo L. Fontaine; Phone (860) 594-3180
Administrative Contact: Joseph Obara

Acceptance Criteria: Special Provision; Prequalification Procedure

Rebar Connectors

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Robert G. Lauzon; Phone (860) 258-0327
Administrative Contact: Keith R. Lane

Acceptance Criteria: AASHTO 8.32.2.3

Release Agents

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Nelio J. Rodrigues; Phone (860) 258-0326
Administrative Contact: Keith R. Lane

Acceptance Criteria: Form 816, 4.06.03-6

Retaining Walls

RESPONSIBLE UNIT: Soils and Foundations Section
Technical Contact: Leo L. Fontaine, Phone (860) 594-3180
Administrative Contact: Joseph Obara

Acceptance Criteria: Special Provision

Rebar Zinc Rich Coatings - Rehabilitation

RESPONSIBLE UNIT: Division of Bridge Design
Technical Contact: Ralph Daily, Jr.; Phone (860) 594-3312
Administrative Contact: James H. Norman

Acceptance Criteria: Recurring Special Provision

Shear Connectors - Welded Stud

RESPONSIBLE UNIT: Division of Materials Testing
Technical Contact: Robert G. Lauzon; Phone (860) 258-0327
Administrative Contact: Keith R. Lane

Acceptance Criteria: Form 816, M.06.02-12; Prequalification AMS D1.5

Silicone Expansion Joint System

RESPONSIBLE UNIT: Division of Bridge Design
Technical Contact: Ralph Daily, Jr.; Phone (860) 594-3312
Administrative Contact: James H. Norman

Acceptance Criteria: Special Provision; Prequalification Procedure

QUALIFIED PRODUCT REFERENCES (WITH ACCEPTANCE CRITERIA) - CONTINUED

Stormwater Treatment (Oil/Grit Separators)

RESPONSIBLE UNIT: Office of Environmental Compliance
Technical Contact: Paul Corrente; Phone (860) 594-2932
Administrative Contact: Joseph Obara

Acceptance Criteria: Special Provision; Prequalification Procedure

Truncated Domes (ADAAG Detectable Warnings)

RESPONSIBLE UNIT: Division of Highway Design
Technical Contact: Daniel A Gladowski; Phone (860) 594-3280
Administrative Contact: James H. Norman

Acceptance Criteria: Special Provision; Prequalification

Variable Depth Patch

RESPONSIBLE UNIT: Division of Bridge Design
Technical Contact: Ralph Daily, Jr.; Phone (860) 594-3312
Administrative Contact: James H. Norman

Acceptance Criteria: Special Provision; Prequalification Procedure

QUALIFIED PRODUCTS FOR USE ON MUNICIPAL OR OTHER NON-CONNDOT SYSTEMS ONLY:

A list of products considered to be acceptable but which are not used in the Department for reasons relating to cost, appearance, logistics, or other reasons not directly related to product performance.

PRODUCTS/TECHNOLOGIES

ACCEPTANCE CRITERIA

Extruded Concrete Curb

Municipal Standards

Sign Post - Solid Filled Tubular
Fiberglass

1. Composite Post 40

Strength Analysis

Corrugated PVC Pipe Smooth

Interior - Sanitary

1. Contech A-2000 Sewer Pipe

Municipal Standards